Realizing the Promise of Conservation Buffer Technology

A Report Based on the National Conservation Buffer Workshop, June, 12-13, 2001
Lied Conference Center, Arbor Day Farm, Nebraska City, Nebraska

SOIL AND WATER CONSERVATION SOCIETY

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About SWCS

The Soil and Water Conservation Society is a private, nonprofit scientific and educational organization that serves as an advocate for the conservation professions and for science-based conservation policy.

The mission of SWCS is to foster the science and art of soil, water, and related natural resource management to achieve sustainability. Members promote and practice an ethic recognizing the interdependence of people and their environment.

SWCS has about 10,000 members worldwide. Those members include researchers, administrators, technicians, educators, planners, legislators, farmers, ranchers, and students. Represented are nearly every academic discipline and many institutions concerned with the management of land and water resources.

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EXECUTIVE SUMMARY

A National Conservation Buffer Workshop was held in June 2001 to create an agenda for action that would further the use of conservation buffer technology and help the U.S. Department of Agriculture (USDA) achieve its goal of assisting farmers and ranchers to install 2 million miles (7.2 million acres) of buffers by the end of calendar year 2002. The workshop involved 51 invited participants, including researchers, program administrators, communication experts, and agricultural and conservation organization representatives.

Three work groups were organized within the workshop: (1) Research Work Group, (2) Policy Work Group, and (3) Communication Work Group. Participants in each work group were asked to come to the workshop with two sets of ideas in hand. Research Work Group participants were asked to (1) recommend what field research on conservation buffers is needed to fill important information gaps about buffer effectiveness and (2) what research exists that could be translated immediately into more up-to-date technical standards and guidelines for buffer design, installation, and maintenance.

Policy Work Group participants were asked for their ideas on (1) how to improve the continuous Conservation Reserve Program (CRP) sign-up so it would work better for agricultural producers and for the environment or (2) suggest a replacement program that would encourage more extensive use of conservation buffer technology.

Communication Work Group Participants were asked for ideas on (1) improving communication with landowners and land managers about conservation buffers and USDA programs designed to help them use buffers to address multiple conservation problems and (2) improving communication and training of USDA personnel with regard to the use of buffer technology.

In organizing the workshop, the Soil and Water Conservation Society sought to take advantage of the enormous opportunity that exists to extend the use of what has been a greatly underused technology at a time when a USDA conservation assistance program—the continuous CRP sign-up—offers landowners in many parts of the country attractive financial incentives to adopt the technology.

From the multitude of ideas offered during the workshop, each of the three work groups used extensive discussion and a voting process to reach a degree of consensus on an action agenda.

The Research Agenda

Members of the Research Work Group adopted a seven-part, 19-point research agenda:

Ecological Relationships of Buffers in Agricultural Landscapes

❶ Evaluate the seasonal and temporal effectiveness of buffers composed of different kinds of plant communities (for example, herbaceous plants versus woody plants, mixtures, and C3 versus C4 plants) on improving soil and water quality and enhancing aquatic and terrestrial wildlife; conduct the evaluations at both the field scale and the watershed scale to develop buffer designs that provide pollutant reductions throughout the year and to determine how long it takes for buffers to achieve maximum effectiveness. Both above- and below-ground processes must be studied, which may require different design strategies.

❷ Evaluate the ecological effects on beneficial and nonbeneficial organisms of placing buffers in different landscapes and different positions within landscapes.

❸ Evaluate the establishment of appropriate buffer types in different ecoregions and in various landscape positions within ecoregions for performing water quality and ecological functions.

Work group participants offered several "for examples" of the specific types of ecologically focused research needed:

- Development of strategies for removing sequestered nitrogen and phosphorus from buffers that have minimal negative effects on buffer performance, coupled with development of methods for determining the effects of these removal strategies on buffer performance.
- Evaluation of the ability of buffers to promote denitrification in groundwater at varying depths, as influenced by dissolved organic carbon from different plant communities.
- Evaluation of the ability of buffers to sequester carbon in above- and below-ground plant components, as well as in soil aggregates and microbial populations.
- Investigation of methods for enhancing the establishment and growth of seedlings in buffers.
- Creation of a site index to aid in plant species selection for buffer.

Enhance the Economic Acceptability and Impact of Buffer Systems

❹ Explore the economic potential for producing marketable commodities in buffers and the potential for developing the necessary infrastructure for marketing those products.

❺ Develop methodologies for evaluating the public and private costs and benefits of buffers; increase capability to estimate the monetary benefits buffers produce by mitigating nonpoint-source pollution and providing habitat; and increase capability to estimate the market value of tangible products that could be harvested from buffers.

Evaluate the Effectiveness of Conservation Buffer Systems for Nonpoint-source Pollution Control

❻ Evaluate the seasonal and temporal effectiveness of conservation buffers in removing nitrate, phosphorus, pesticides, and pathogens in different hydrogeologic settings. What buffer widths, with what vegetative compositions, are needed to meet pollution reduction goals?

❼ Evaluate hydrologically active areas in the landscapes to determine the most suitable positions for buffers.

One example of the needed research identified by work group participants was the following: Quantification of the impacts of upland buffers on field hydrology in different geological settings. Specifically, the effect of buffers on the volume of shallow groundwater flow that is routed through the biologically active zone of down-slope buffers and the ability to enhance and deepen that biologically active zone by modifying the plant species in the buffers, changing the dissolved carbon that is available at different depths in the profile.

Interaction of In-field Practices with Buffers—Especially to Address Tile Drainage and Concentrated Flow

❽ Develop buffer systems and supporting practices that effectively deal with water and related nonpoint-source outputs in tile-drain systems and where buffers receive concentrated flow from surface runoff.

❾ Use paired watersheds and other research methods to evaluate the effectiveness of riparian buffers and wetlands, individually or in combination, to mitigate nonpoint-source pollution in tile-drained landscapes.

❿ Evaluate the impact of different riparian grazing strategies on channel morphology, water quality, and the fate of livestock-associated pathogens and antibiotics.

⓫ Evaluate the effectiveness of level spreaders, water bars, vegetative barriers, and buffers themselves for dispersing concentrated flow and ascertain what maintenance is necessary to sustain a specified level of effectiveness.

⓬ Develop procedures for evaluating buffer effectiveness and strategies for maintenance to optimize effectiveness over the long term.

Modeling and Decision Aides for Multiple Users–Landowners, Policymakers, Regulators

⓭ Enhance field-scale models to account for the effects of buffer practices on key hydrologic and water quality processes, particularly flow redirection,

backwater effects, slope changes over time, infiltration, and clear water coming out of buffers.

⓮ Incorporate buffer functions, especially those of riparian buffers, into watershed-scale hydrologic, water quality, and ecosystem models.

⓯ Use modeling tools to relate buffer effectiveness to total maximum daily loads (TMDLs) on a watershed scale.

⓰ Devise a "buffer quality kit" for use as a protocol to inspect buffers and to estimate their effectiveness for specified conservation purposes.

The work group offered two examples of the type of modeling-related research needed:

- Development of statistical tools that can be used to extend plot-scale information to a watershed scale.
- Use of process-based models to develop simple relationships between pollutant loading, buffer width, and vegetation that can be applied at the field-office level.

Expanding the Concept of Pollution Control in Buffer Systems

⓱ Enhance the effectiveness of buffers for pollution control in a wide variety of hydrologic settings and for a greater number of potential pollutants.

Among the specific types of research needed are the following:

- Determination of the effectiveness of buffers in urban and suburban areas.
- Determination of the role of buffers in mobilizing trace elements and reduced forms of phosphorus and nitrogen.
- Determination of the effectiveness of buffer plants to intercept pesticide drift and odors and ascertain the long-term impacts of pesticides on the species composition of buffers.
- Determination of the role of buffers in intercepting and immobilizing pathogens.

Role of Buffers in Stream Corridor Restoration

⓲ Compare the potential ability of different plant communities in buffers to improve stream geomorphology, bank stability, biological communities, and in-stream removal of nutrients and pesticides—in natural and channelized streams.

⓳ Identify the natural processes that are required to restore riparian ecosystems and, in particular, evaluate and compare active versus passive (natural) restoration techniques.

The Policy Reform Agenda

The Policy Work Group adopted a 15-point agenda for reforming the continuous CRP sign-up in ways that, in their view, would make the program work better for conservation, for landowners, and for USDA.

Policy Reform Requiring a Statutory Change

❶ Allow limited, managed haying and grazing of conservation buffers in the continuous CRP for maintenance and other purposes.

Buffers, as living filters, capture sediment, nutrients, chemicals, and pathogens. As the concentration of some of these potential pollutants builds up within buffers, removal of at least some of the vegetation is necessary for maintenance purposes. Haying or grazing under an approved plan, for maintenance purposes, is thus essential to the proper functioning of some buffers. Haying or grazing also can be advantageous in maintaining healthy stands of vegetation within buffers over a period of time, and the periodic use of forage from buffers could be an added incentive to program participants. A change in statutory language is necessary to overcome the current prohibition on haying and grazing of CRP acres, except under emergency circumstance.

❷ Increase the CRP acreage cap to accommodate the continuing enrollment of conservation buffers.

From the outset of the continuous CRP sign-up, USDA and Congress have annually agreed to an acreage holdback for buffers under the current 36.4-million-acre CRP cap. That holdback is currently 4 million acres. Debate continues, however, about the use of a substantial acreage for buffers under the current CRP cap for buffers as opposed to the general sign-up. Work group participants thus recommended increasing the CRP cap to accommodate an acreage holdback for buffers, without impacting the number of acres available for the general sign-up. While no specific numbers were incorporated into the group's recommendation, discussion generally focused around a holdback of 4 million to 5 million acres and a CRP cap on the order of 40 million acres.

❸ Allow wetland restoration as an eligible practice on marginal pastureland.

The continuous CRP sign-up now accommodates only the enrollment of riparian buffers on marginal pastureland. Work group participants identified wetland restoration as a practice that could help achieve numerous conservation objectives within riparian zones on grazing land, including flood control, groundwater recharge, water quality improvement, and fish and wildlife habitat enhancement.

❹ Permit contracts longer than 15 years under the continuous CRP sign-up.

Recognizing that the useful life of some buffer practices extends beyond the current maximum of 15 years for CRP contracts, work group participants suggested that additional contract options be added in the program's statutory language to realize the long-term environmental benefits of certain buffers.

❺ Codify a CRP acreage holdback for conservation buffers in the continuous CRP sign-up.

In addition to ensuring that acres remain available as a holdback under the CRP cap for buffer enrollments (see recommendation 2), work group participants recommended that such an acreage holdback be written into statutory language in the next farm bill.

❻ Explicitly incorporate the continuous CRP sign-up and its CREP compo-

nent into the next farm bill.

USDA created both programs by administrative rules, using authorities in the 1996 and prior farm bills. To ensure the continuation of both programs, work group participants recommended codifying both in the new farm bill.

Policy Reform Requiring a Rule Change

❼ Make all agricultural land eligible for filter strips/riparian buffers.

Currently, only cropland that has been in production of certain agricultural commodities in two of the prior five years is eligible for enrollment in the continuous CRP, along with marginal pastureland, on which a landowner must establish a riparian buffer. These limitations preclude the enrollment of buffers on other working land, such as land in fruit and vegetable production. This recommendation would allow the continuous CRP sign-up to be extended to all cropland and grazing land, regardless of crop produced or frequency of production.

❽ Streamline enrollment in the continuous CRP sign-up with new application and planning procedures, including the use of technical assistance from outside NRCS.

Anecdotal evidence suggests that application and planning procedures in some USDA service centers is long and involved, requiring multiple trips to the service center to complete the enrollment process. Work group participants suggested streamlining the application and planning processes, using less paper and interactive computer systems within service centers, along with third-party technical assistance, where necessary.

❾ Provide a restrictive covenant or permanent easement option for participants in the continuous CRP sign-up, with rental payments made up front.

Authorities exist to use easements or mechanisms other than contracts within the context of the CRP. This recommendation goes beyond the use of contracts by endorsing the use of those authorities by FSA to ensure that the environmental benefits of some buffers extend beyond the current program limitations.

Policy Reform Requiring an Administrative Change

❿ Change the riparian buffer standard to permit more grass and fewer trees and shrubs to be used in these buffers.

By definition, a riparian buffer includes trees and/or other woody vegetation in those portions of the buffer adjacent to a stream, lake, or wetland. How many trees and/or shrubs pre acre must be planted is governed in part by the technical standard for a riparian buffer, which NRCS writes, and by the interpretation of rules implementing the CRP, the statutory language for which requires planting trees on marginal pasture. Differences of opinion among personnel within each agency and between agencies have resulted in differences of opinion in some locations over how many trees are needed to meet the spirit and letter of the law. As a result, few riparian buffer installations result. This recommendation suggests giving USDA personnel at state and local levels greater flexibility to adjust the mix of grass, trees, and shrubs in riparian buffers to suit particular conservation objectives and harmonize buffer installations with local ecological conditions.

⓫ Provide a new incentive for the initial buffer demonstration in any particular county or watershed.

Few or no buffer installations have occurred in many locales. On the basis that demonstration by farmers or ranchers who are looked up to by their peers in a community is a good way to encourage use of new technology, work group participants supported use of an incentive for initial buffer installations in counties or small watersheds.

⓬ Allow local USDA officials, via local work groups, greater flexibility in implementing the continuous CRP sign-up.

Buffers, like most conservation practices, must be designed, installed, and maintained to fit site-specific conditions. Landowner objectives also vary significantly. This recommendation is aimed at giving local USDA personnel greater flexibility in the use of buffers enrolled in the continuous CRP, for example, greater flexibility in the kind, numbers, and seeding rates of plant materials used; the width of buffers; the planning of integrated buffer systems; the protection of remnant prairie areas; and so forth.

⓭ Offer a financial bonus or incentive to those farmers and ranchers who collectively use the continuous CRP sign-up to install buffers along a particular watercourse, around a water body, or within a particular landscape.

USDA's conservation assistance programs typically reward individual farmers and ranchers for their conservation actions. On a watershed or landscape scale, however, action often is required by multiple landowners if there is to be any significant environmental impact. This recommendation encourages USDA to extend the financial incentives of the continuous CRP sign-up to groups of landowners willing to act collectively in the public good. The Oregon CREP now provides for this with a cash incentive that is paid to all of those landowners who install a riparian buffer along a particular stream stretch by a certain date. This kind of incentive makes landowners salesmen and saleswomen for the program.

⓮ Extend all financial incentives in the continuous CRP sign-up to all eligible buffer practices.

Currently, rental rate incentives only apply to 5 of the 10 buffer practices eligible for the continuous CRP sign-up. Other buffer practices do not qualify for the sign-up incentive or for maintenance payments. This complicates program administration by USDA personnel and creates confusion among landowners. Work group participants suggested that all incentives be applied to all eligible buffer practices as a means of simplifying program administration and improving landowner understanding of program details.

⓯ FSA and NRCS need to put more proactive people (employees and partners) in the field to implement the continuous CRP sign-up and give the program greater emphasis among workforce priorities.

Use of the continuous CRP sign-up varies dramatically from county to county and state to state. In many cases, work group participants concluded, this was because FSA and/or NRCS administrators have not given the pro-

gram's delivery the emphasis it deserves. This recommendation was based on the premise that buffer technology remains an underutilized technology and the continuous CRP remains an underutilized program in many locations. Recognizing the limited staff within both agencies at some locations, participants also wanted to encourage the solicitation of partners from both the public and private sectors to help promote the use of buffers and the continuous CRP as part of a more comprehensive approach to dealing with conservation problems on the nation's working land.

The Communication Agenda

The Communication Work Group's action plan is based on five goals. Each goal is supported by specific action items designed to promote the use of conservation buffers.

Build Partnerships

❶ Conduct a conservation buffer information and marketing workshop in each of the six NRCS regions to discuss partnering opportunities and innovative techniques for making one-on-one contacts with landowners.

❷ Develop partnerships with corporate America and other allies to promote the use of buffers, including (a) the solicitation of funds from business to help promote participation in the continuous CRP sign-up and (b) collaboration with an organization, such as the National Arbor Day Foundation, to sponsor a national conservation buffer poster contest.

❸ Determine how USDA conservation assistance programs can be used in conjunction with programs sponsored by state/local governments and private organizations to extend the use of buffer technology.

❹ Make sure USDA's conservation assistance programs—particularly the continuous CRP sign-up—can work jointly with other federal programs (such as those administered by the Army Corps of Engineers, Fish and Wildlife Service, and Environmental Protection Agency).

❺ Develop an advocacy group of farmers and ranchers who have installed buffers to speak to other farmers, ranchers, farm managers, rural bankers, etc., about the merits of using these conservation practices.

Develop a Buffer Toolkit and Related Promotional Materials

❻ Provide "how-to" partnering information and success stories for use in "BufferNotes", on the NRCS website, and in other widely used forums.

❼ Develop a buffer promotional toolkit that includes:

- Specifications for signage
- PowerPoint presentation
- Examples of direct mail pieces
- Exhibit designs
- CD of buffer photographs
- Economic worksheet for local use

❽ Develop computer-based, interactive economic tools for field office use.

❾ Provide guidance to field staff on how to identify priority areas for targeting promotional efforts.

❿ Develop templates for materials that can be customized for local promotional activities.

Initiate More Extensive Buffer Training

⓫ Each region should organize a one-day meeting/tour for state technical committees, other partners, policymakers, and decision-makers to see how farmers and ranchers are using buffers and to hear from them on the merits of using the technology.

⓬ Develop a buffer training strategy for NRCS staff, other USDA agencies, and state/local/private sector partners that can be delivered at the state level and includes technology, program delivery, and marketing components.

⓭ The buffer training strategy should be implemented and evaluated during federal fiscal years 2002 through 2005.

Identify Marketing Strategies

⓮ Organize a conservation buffer forum at the NACD annual meeting for the benefit of conservation district leaders, district employees, and partners.

⓯ Through additional analyses, identify target audiences and develop key messages for those audiences.

⓰ Outline media strategies to address communication needs (a) within USDA—by providing tools for local use—and (b) outside of USDA—targeting both small and large markets.

⓱ Produce promotional items—hats, T-shirts, signs, etc.—and work to establish a National Buffer Day that might be celebrated in conjunction with Arbor Day, Earth Day, or a similar event.

Expand Constituency Support

⓲ Target those utilities responsible for providing drinking water.

⓳ Target those decision-makers involved in resolving total maximum daily load (TMDL) issues.

⓴ Target urban dwellers who control the votes nationally.

㉑ Target the developers and users of K-12 curriculum materials who are in a position to incorporate information about conservation buffers into those educational materials.

㉒ Target environmental interests that have a large stake in the use of buffers by landowners across the country.

Introduction

An exhaustive report published in 1993 by the National Research Council's Board on Agriculture concluded: "Managing the landscape by creating or restoring buffer zones is a promising way to increase the effectiveness and lower the costs of programs to protect soil and water quality."

That report, coupled with the promulgation of rules to create the continuous Conservation Reserve Program (CRP) sign-up using authorities contained in the 1996 and prior farm bills, prompted the Natural Resources Conservation Service (NRCS) to undertake the National Conservation Buffer Initiative in late 1996 as a means of encouraging farmers and ranchers to use more extensively a greatly underused set of conservation practices. The initiative became a department-wide pursuit within the U.S. Department of Agriculture (USDA) in February 1997.

WHAT IS A BUFFER?

Conservation buffers are living filters. While their shapes may vary, most are relatively narrow strips of land, and all feature a permanent vegetative cover of grass, shrubs, and/or trees. Buffers are strategically located within crop fields, at the edge of crop fields, or in other locations on the landscape where they can protect elements of the natural environment, such as streams or lakes, or manmade structures, such as buildings or roads, from the potentially adverse effects of weather and such human activities as agriculture and timber harvest.

While many people, even some conservationists, often think of buffers only in terms of the common streamside buffers—filter strips and riparian forest buffers—the range of buffer practices is far more extensive, including many old and time-tested upland buffer practices, such as grassed waterways, field borders, contour grass strips, cross-wind trap strips, field windbreaks, and shelterbelts. Among the more recent adaptations of buffer technology are such practices as living snow fences and grass hedges. The NRCS field office technical guide now includes about a dozen so-called buffer practices, depending upon how specific practices, such as field windbreaks, shelterbelts, and living snow fences are differentiated from one another and what names are attached to each in different parts of the country.

Other common conservation practices are sometimes considered buffers as well, depending on their placement and purpose. This is particularly so for wetlands. And in urban settings, which USDA's buffer initiative has not ignored, but not given much attention to thus far, save for a national conference on the use of buffers in urbanizing landscapes, held in May 2000, buffers can refer to much more expansive strips of open space designed to achieve a host of conservation objectives, including aesthetic ones.

Why the Buffer Initiative?

The buffer initiative was undertaken with two objectives in mind: (1) To make the nation's farmers and ranchers more aware of conservation buffers and how those practices can help landowners address a range of conservation problems on cropland and grazing land and (2) to make those same farmers and ranchers more aware of USDA's conservation assistance programs, both technical and financial, that are available to help landowners use buffer practices effectively to reduce soil erosion, improve air and water quality, enhance fish and wildlife habitat, and achieve other conservation objectives. A theme for the initiative—"Buffers: Commonsense Conservation"—was selected following a series of focus groups with farmers and ranchers in different parts of the country. Nearly 100 federal agen-

USDA established a goal of helping landowners install up to 2 million miles of conservation buffers by the end of calendar year 2002.

cies, national agricultural and conservation organizations, and agribusiness firms have since signed on as members of the National Conservation Buffer Team.

From the outset of the buffer initiative, it was recognized that buffers alone would not solve all or even most conservation problems. USDA personnel were admonished to employ three principles in working with landowners across the country:

1. Be flexible in designing and installing buffers; in other words, help buffers fit the operational needs of farmers and ranchers.

2. Couple the use of buffers with other practices that enhance the performance of buffers, practices such as conservation tillage and nutrient management. Another way of putting it: "Think conservation systems!"

3. Whenever possible and practical, encourage landowners to install buffers in a way that achieves multiple conservation goals. A buffer practice, for example, might be installed for water quality improvement purposes, but with minor adjustments in width, plant material, or other factors, the buffer also could become superb wildlife habitat.

USDA established a goal of helping landowners install up to 2 million miles of conservation buffers by the end of calendar year 2002. That 2-million-mile goal translated into 7.2 million acres, based on a presumed average width of 30 feet across all buffer types. While ambitious, that goal still seems achievable, given estimates of buffer needs that approach 20 million or more acres.

Progress toward the goal has ebbed and flowed in different parts of the country over the past four and a half years. In some states, USDA personnel and partners have proactively "sold" the use of conservation buffers to farmers and ranchers, with considerable success. Elsewhere progress has been slow. As of September 30, 2001, 4.0 million acres (1.1 million miles) of buffers had been installed nationwide. That was 55 percent of the USDA goal.

Buffer installations using the continuous CRP sign-up exemplify the substantial variation in activity from state to state. Through August 2001, for example, 1,671,218 acres of conservation buffers had been enrolled via the continuous sign-up (including the Conservation Reserve Enhancement Program), but two-thirds of those acres were enrolled in just six states, and only two states—Iowa and Illinois—accounted for a third of the enrolled acres.

This unevenness in program participation has prompted questions about program design, implementation, and related communication efforts. Questions also have been raised about buffer effectiveness to achieve certain conservation objectives, particularly in the case of water quality improvements.

It was with these considerations in mind that the Soil and Water Conservation Society (SWCS) proposed to NRCS in late 2000 the organization of a National Conservation Buffer Workshop. The purpose of the workshop was to create an agenda for action that would allow USDA to realize more fully the promise of conservation buffer technology and facilitate achievement of the 2-million-mile goal.

That workshop was held June 12-13, 2001, at Arbor Day Farm in Nebraska City, Nebraska. It involved, by invitation, 51 of the nation's leading buffer researchers, program administrators, communication experts, and private-sector representatives who have an interest in the use of conservation buffer technology.

The Workshop Process

The National Conservation Buffer Workshop was organized around three work groups, a Research Work Group, a Policy Work Group, and a Communication Work Group. Participants in each of the work groups (see Appendix A) were asked to come prepared with lists of ideas in response to two questions. In the case of the Research Work Group, participants were asked to suggest at least three and no more than five priorities for (a) field research on conservation buffers needed to fill current information gaps regarding buffer effectiveness and/or (b) the translation of research results into more up-to-date technical standards/guidelines for conservation buffer design, installation, and maintenance.

Policy Work Group participants were asked to suggest three to five ideas for refining the continuous CRP sign-up to make it work better for conservation and for landowners. Each participant also was given the opportunity to propose a new federal program designed to encourage more extensive use of conservation buffers to achieve multiple conservation objectives.

Participants in the Communication Work Group were requested to suggest three to five ideas for (a) improving USDA's communication with landowners and land managers about conservation buffers and the USDA conservation programs designed to help them use buffers to address multiple conservation problems and/or (b) improving communication and training of USDA personnel with regard to buffers and their use to achieve multiple conservation purposes.

Participants put their ideas on the table, one-by-one, in round-robin fashion, during the work group deliberations (see Appendix B). Extensive discussion allowed work group participants to clarify each idea and evaluate its merits. A series of short, interactive sessions also allowed for the transfer of ideas from one work group to another, for example, the conveyance of ideas to the Research Work Group from the Policy and Communication Work Groups, and so forth. A voting process was used within each work group to determine the group's priorities for its action plan.

The Upshot

A sense of urgency exists about the use of conservation buffer technology. USDA leaders recognized the potential for use of buffers to address a variety of conservation problems on agricultural land, and they responded by creating a conservation assistance program—the continuous CRP sign-up—that offers agricultural producers attractive financial incentives

to expand their use of the technology. So there now exists that rare combination of a conservation technology, heretofore greatly underused, and a program designed specifically to make more extensive and effective use of that technology. The opportunity is one that agricultural producers and conservation interests alike cannot afford to miss, not only in terms of achieving conservation on the ground in a voluntary fashion, but also in terms of helping producers comply with Clean Water Act, Safe Drinking Water Act, and similar regulations at federal, state, and local levels.

Collectively, the three action agendas that follow offer a measure of promise for realizing the potential of using buffer technology to address a range of important conservation issues on privately owned land in this country and for moving the National Conservation Buffer Initiative toward achievement of its 2-million-mile goal. The latter may not occur by the end of calendar year 2002, but the goal clearly is an achievable one, given the 20-million-acre-plus potential for use of buffers, and one that, even if not reached in the near term, will result in considerably more conservation on the ground than would have occurred otherwise.

SWCS did not organize this workshop to identify shortcomings in USDA's buffer initiative, but rather to highlight the opportunity that initiative still presents. The workshop confirmed the technical potential of conservation buffers to address many of the most pressing environmental and conservation problems confronting agriculture. The workshop also confirmed that the continuous CRP sign-up represents an effective, versatile tool to get conservation buffers on the ground where needed.

This coincidence between an effective, versatile technology with an effective, versatile tool with which to apply that technology creates a rare window of opportunity, not only to help producers, but also to advance conservation. The research, policy, and communication agendas produced by workshop participants are, we hope, a useful contribution toward ensuring that the full potential of the National Conservation Buffer Initiative is realized. The window of opportunity created by the buffer initiative may not be as open in the future as it is today. While that window is open, it is imperative that we take full advantage of the benefits buffers provide to producers, to taxpayers, and to the environment.

Buffers: A Research Agenda

Many conservation buffers are time-tested practices. Grassed waterways, field windbreaks, and shelterbelts, for example, were commonplace on farms and ranches five and six decades back, and these buffers have been the subject of much research over the years. Accepted practice standards and design criteria for these buffer types have been in place for years. Those individuals who provide technical assistance to farmers and ranchers across the country feel comfortable with these standards and specifications, and they help design and install the buffers with a high degree of assurance about what conservation accomplishments will result.

Other buffers represent either new technology or innovative adaptations of older buffer technology. Riparian forest buffers, filter strips, living snow fences, and grass hedges are among these newer

Researcher from Texas Tech University uses a global positioning system to gather data on the benefits of buffers. USDA/NRCS Photo

buffer types. While research has not ignored the performance potential of these practices in recent decades, the more limited use of these buffers, coupled with limited laboratory and field research on the variability inherent in specific site characteristics, design specifications, and maintenance considerations, has prompted questions since the outset of USDA's buffer initiative about what these practices might achieve, from a water quality improvement point of view, from a fish and wildlife habitat enhancement point of view, and so forth.

Not long after USDA's buffer initiative was announced, NRCS analysts completed a literature review to learn what could be said about buffer performance from a water quality improvement point of view. That exercise produced a number of conclusions. First, research to that point in time had been limited, and most of that research had focused on sediment and nutrient reductions. Little work had been completed on pesticide- and pathogen-related issues.

Second, the results of what research had been done were somewhat variable. In a few cases and for certain purposes, buffers proved relatively ineffective, for a variety of reasons, including incorrect design and placement and poor maintenance. In many other cases, the potential for use of conservation buffers to reduce sediment, nutrient, pesticide, and pathogen problems was clearly evident.

Somewhat later, NRCS commissioned Texas A&M University to conduct a modeling study of what levels of sediment reduction might be accomplished with the installation of all applicable in-field and edge-of-field buffers on cropland. The results were profound. Approximately 5 million acres of buffers could appropriately be installed on about two-thirds of the cropland across the country. If those buffers were installed, sediment delivery would effectively be reduced on those cropland acres. The actual sediment reduction on the treated acres could approach 60 percent. With the reduction in sediment loss, of course, also could come significant reductions in nutrients and pesticides.

Still later, a review of published research on the use of buffers to reduce nonpoint-source water pollution from cropland was commissioned through USDA's National Agroforestry Center. That review concluded, in general, that within-field and on-farm affects of buffers can be substantial and that, while no data exist to show that buffer installations on cropland reduce pollutant amounts in streams and lakes, strong, indirect evidence clearly indicates a great potential for buffers to do so. The actual reductions that might occur on a landscape scale will depend on many factors, only some of which have been well researched to date.

It was clear that a large body of research indicated that buffers, if properly designed, installed, and maintained, would work well to enhance the environment. It also was clear that key gaps in knowledge still exist—gaps that, if filled, could significantly improve the performance of buffers in the field and boost USDA's buffer initiative. It was a desire to provide a blueprint for filling those gaps in our knowledge that largely prompted organization of the National Conservation Buffer Workshop and creation of a Research Work Group as a part of that workshop.

Research Work Group participants were asked to identify the specific types of field research needed to fill the current information gaps regarding buffer effectiveness or what research results exist that could yield more up-to-date technical standards and guidelines for buffer design, construction, and maintenance.

The Ideas

Research Work Group participants confirmed that the scientific evidence builds a compelling case for use of conservation buffers to improve the environment. Small-scale studies show that buffers allow us to take advantage of the natural processes that occur within and adjacent to buffers to trap, process, and immobilize pollutants. At a larger scale, buffers can provide critical fish and wildlife habitat for particular species in particular locations. Buffers also can improve the aesthetic value of the landscape and provide hours of pleasure to landowners.

Buffers have specific advantages as a conservation technology because they can reverse and prevent further degradation of habitat or environmental quality and avoid the more costly treatments needed to repair damage; are relatively simple to understand and maintain; are popular among landowners; simultaneously produce multiple environmental benefits for soil, water, air, habitat, and aesthetics; and directly improve in-steam habitat and the biological integrity of aquatic ecosystems.

"You can't lose with buffers," one work group participant remarked in summarizing the case for buffers. That may be an overstatement in certain locations and

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in certain applications, but participants agreed that it generally was true.

Research Work Group participants also agreed that more work is needed to realize the full promise of buffer technology. Their goal was to have in hand the scientific and technical know-how to write prescriptions for buffers on varied landscape positions in every region of the country and to achieve every appropriate conservation purpose. They wanted to assure that field-based conservationists have the tools they need to make decisions and recommendations about how wide is wide enough or what kind of buffer structure, placement, and/or plant materials are needed to achieve a prescribed conservation objective.

Members of the work group responded by offering 46 specific recommendations for a research agenda to achieve their goal (see Appendix B). Another seven ideas were collected from members of the Policy Work Group and the Communication Work Group. Nearly all of the ideas focused on needed field research as opposed to technology transfer activities. In addition, the group identified two cross-cutting items that should guide the design and implementation of a buffer research agenda. First, there is a critical need to move research out of the laboratory or off research plots and into field and watershed settings. Second, research must address the use of buffer systems or, more appropriately perhaps, conservation systems, rather than individual buffer practices. Those buffer systems should include all three buffer types: upland buffers, riparian buffers, and stream corridor practices.

Laboratory and field research plot studies only indicate the potential for buffers to function under idealized and uniform conditions, usually with small discharge rates and short-duration experiments. Results of such studies provide an indication of the optimum functioning of upland buffers receiving dispersed flow at the edges of small fields. This is valuable but incomplete information. Small-plot research cannot account for the greater flow rates that occur as field size increases or where flow becomes concentrated. Neither does it account for the variations in hydrogeology and soils that often are encountered in moving downstream through a watershed. The preferred combination of buffers needed to meet multiple objectives in a landscape may not result in a uniformly wide green strip along a stream, but in a variety of buffer sizes and types at different locations. Dense, narrow buffers may be the best practice to reduce sediment delivery at critical points in a field or riparian area, while large, blocky buffers may be needed elsewhere to provide the best wildlife habitat and groundwater clean-up.

Working at the watershed level makes it clear that buffers alone will not solve all conservation problems. Buffers placed along large rivers provide habitat, bank stability, and flood control functions, but have relatively less impact on water quality. Buffering instead should begin in the fields and headwater reaches where most runoff, sediment, and chemical pollutants first enter a channel system. A landscape conservation system must include in-field conservation, upland and riparian buffers, and a complete riparian management system that addresses such problems as streambank erosion, channel modifications, field drainage tiles, and riparian grazing. Streambank bioengineering strategies; in-stream structures, like boulder weirs/riffle structures; constructed field-tile wetlands; and grazing strategies, such as intensive rotational grazing and narrow corridor fencing with water access, must be studied and developed to provide a complete package of buffer design and evaluation tools.

The Agenda

After considerable give and take in their discussion, members of the Research Work Group adopted a seven-part, 19-point research agenda:

Ecological Relationships of Buffers in Agricultural Landscapes

❶ Evaluate the seasonal and temporal effectiveness of buffers composed of different kinds of plant communities (for example, herbaceous plants versus woody plants, mixtures, and C3 versus C4 plants) on improving soil and water quality and enhancing aquatic and terrestrial wildlife; conduct the evaluations at both the field scale and the watershed scale to develop buffer designs that provide pollutant reductions throughout the year and to determine how long it takes for buffers to achieve maximum effectiveness. Both above- and below-ground processes must be studied, which may require different design strategies.

❷ Evaluate the ecological effects on beneficial and nonbeneficial organisms of placing buffers in different landscapes and different positions within landscapes.

❸ Evaluate the establishment of appropriate buffer types in different ecoregions and in various landscape positions within ecoregions for performing water quality and ecological functions.

Work group participants offered several "for examples" of the specific types of ecologically focused research needed:

- Development of strategies for removing sequestered nitrogen and phosphorus from buffers that have minimal negative effects on buffer performance, coupled with development of methods for determining the effects of these removal strategies on buffer performance.
- Evaluation of the ability of buffers to promote denitrification in groundwater at varying depths, as influenced by dissolved organic carbon from different plant communities.
- Evaluation of the ability of buffers to sequester carbon in above- and below-ground plant components, as well as in soil aggregates and microbial populations.

- Investigation of methods for enhancing the establishment and growth of seedlings in buffers.
- Creation of a site index to aid in plant species selection for buffer.

Enhance the Economic Acceptability and Impact of Buffer Systems

❹ Explore the economic potential for producing marketable commodities in buffers and the potential for developing the necessary infrastructure for marketing those products.

❺ Develop methodologies for evaluating the public and private costs and benefits of buffers; increase capability to estimate the monetary benefits buffers produce by mitigating nonpoint-source pollution and providing habitat; and increase capability to estimate the market value of tangible products that could be harvested from buffers.

Evaluate the Effectiveness of Conservation Buffer Systems for Nonpoint-source Pollution Control

❻ Evaluate the seasonal and temporal effectiveness of conservation buffers in removing nitrate, phosphorus, pesticides, and pathogens in different hydrogeologic settings. What buffer widths, with what vegetative compositions, are needed to meet pollution reduction goals?

❼ Evaluate hydrologically active areas in the landscapes to determine the most suitable positions for buffers.

One example of the needed research identified by work group participants was the following: Quantification of the impacts of upland buffers on field hydrology in different geological settings. Specifically, the effect of buffers on the volume of shallow groundwater flow that is routed through the biologically active zone of downslope buffers and the ability to enhance and deepen that biologically active zone by modifying the plant species in the buffers, changing the dissolved carbon that is available at different depths in the profile.

Interaction of In-field Practices with Buffers—Especially to Address Tile Drainage and Concentrated Flow

❽ Develop buffer systems and supporting practices that effectively deal with water and related nonpoint-source outputs in tile-drain systems and where buffers receive concentrated flow from surface runoff.

❾ Use paired watersheds and other research methods to evaluate the effectiveness of riparian buffers and wetlands, individually or in combination, to mitigate nonpoint-source pollution in tile-drained landscapes.

❿ Evaluate the impact of different riparian grazing strategies on channel morphology, water quality, and the fate of livestock-associated pathogens and antibiotics.

⓫ Evaluate the effectiveness of level spreaders, water bars, vegetative barriers, and buffers themselves for dispersing concentrated flow and ascertain what maintenance is necessary to sustain a specified level of effectiveness.

⓬ Develop procedures for evaluating buffer effectiveness and strategies for maintenance to optimize effectiveness over the long term.

Modeling and Decision Aides for Multiple Users–Landowners, Policymakers, Regulators

⓭ Enhance field-scale models to account for the effects of buffer practices on key hydrologic and water quality processes, particularly flow redirection, backwater effects, slope changes over time, infiltration, and clear water coming out of buffers.

⓮ Incorporate buffer functions, especially those of riparian buffers, into watershed-scale hydrologic, water quality, and ecosystem models.

⓯ Use modeling tools to relate buffer effectiveness to total maximum daily loads (TMDLs) on a watershed scale.

⓰ Devise a "buffer quality kit" for use as a protocol to inspect buffers and to estimate their effectiveness for specified conservation purposes.

The work group offered two examples of the type of modeling-related research needed:

- Development of statistical tools that can be used to extend plot-scale information to a watershed scale.
- Use of process-based models to develop simple relationships between pollutant loading, buffer width, and vegetation that can be applied at the field-office level.

Expanding the Concept of Pollution Control in Buffer Systems

⓱ Enhance the effectiveness of buffers for pollution control in a wide variety of hydrologic settings and for a greater number of potential pollutants.

Among the specific types of research needed are the following:

- Determination of the effectiveness of buffers in urban and suburban areas.
- Determination of the role of buffers in mobilizing trace elements and reduced forms of phosphorus and nitrogen.
- Determination of the effectiveness of buffer plants to intercept pesticide drift and odors and ascertain the long-term impacts of pesticides on the species composition of buffers.
- Determination of the role of buffers in intercepting and immobilizing pathogens.

Role of Buffers in Stream Corridor Restoration

⓲ Compare the potential ability of different plant communities in buffers to

Riparian buffer, Story County, Iowa
USDA/NRCS Photo

improve stream geomorphology, bank stability, biological communities, and in-stream removal of nutrients and pesticides—in natural and channelized streams.

19 Identify the natural processes that are required to restore riparian ecosystems and, in particular, evaluate and compare active versus passive (natural) restoration techniques.

key gaps in knowledge still exist—gaps that, if filled, could significantly improve the performance of buffers in the field and boost USDA's buffer initiative.

Buffers: A Policy Reform Agenda

Eligible cropland includes any land planted to an agricultural commodity in two of the prior five years.

For decades, USDA has made available to landowners an amalgam of conservation assistance programs that encourage the adoption of various conservation practices, including conservation buffers. Included were financial incentive programs, such as the old Agricultural Conservation Program and the current Environmental Quality Incentives Program and Wildlife Habitat Incentives Program. There also have been land retirement programs, including the CRP and Wetlands Reserve Program (WRP), and a host of watershed-based demonstrations and emergency programs. Ever present, too, has been the technical assistance offered by the department through NRCS and its predecessor, the Soil Conservation Service.

In 1996, using authorities contained in the 1996 and prior farm bills, the Farm Service Agency (FSA) added to this suite of programs by promulgating a rule to create what is commonly referred to as the continuous CRP sign-up. This program was intended to focus specifically on retirement of the nation's most environmentally sensitive cropland and marginal pasture by enrolling acres devoted to certain conservation buffer practices—filter strips, riparian forest buffers, grassed waterways, shelterbelts, field windbreaks, living snow fences, contour grass strips, and cross-wind trap strips. Also declared eligible were three practices not normally included in the NRCS list of conventional buffer practices: shallow water areas for wildlife, designated wellhead protection areas, and salt-tolerant vegetation or vegetation to reduce soil salinity.

As the program's name implies, sign-up is continuous, as opposed to the periodically announced sign-up periods that characterize administration of the general CRP. The continuous CRP sign-up also dispenses with the calculation of an environmental benefits index and the bidding process used in the general CRP. Offers of acres for the continuous sign-up are automatically accepted if the land offered for enrollment is suitable for the buffer practices specified and the landowners meet all other eligibility requirements. Landowners receive the maximum rental rate per acre that is normally paid under the CRP for comparable soils in a locale. A separate rental rate scheme has been established for marginal pasture. Local cash rent for grazing land is the basis for that scheme. Eligible cropland includes any land planted to an agricultural commodity in two of the prior five years. Marginal pastureland, which was defined as land degraded by livestock use or neglect, can only be enrolled as a riparian forest buffer, a practice that requires the planting of trees or other woody vegetation.

Program participants initially are provided up to 50 percent cost sharing for practice installation, followed by an annual rental rate payment per acre over the course of the 10- to 15-year contracts, a rental payment incentive for certain buffer practices (20 percent for filter

strips, riparian forest buffers, grassed waterways, and field windbreaks and 10 percent for wellhead protection areas), and an annual maintenance payment per acre. In May 2000, a signing incentive payment of $100 per acre for a 10-year contract and $150 per acre for a 15-year contract, a 40 percent practice incentive payment, and higher annual maintenance payments per acre for certain practices were put in place to encourage broader program participation. Rental rates for marginal pasture also were adjusted upward in many locations to bring them more in line with cash rents for hayland and pasture. Earlier, those rental rates had been reduced, significantly in some areas, on the basis that land in forage production did not merit an annual rental payment comparable to what was being paid for land in food and feed grain production. Earlier as well, USDA had redefined marginal pastureland to include any grazing land, whether previously seeded or not, along permanent or seasonal streams and around lakes and other permanent water bodies. This redefinition was intended to accommodate the enrollment of riparian buffers on rangeland in the West.

As a component of the continuous CRP sign-up, FSA also promulgated a rule creating the Conservation Reserve Enhancement Program (CREP). This program operates in much the same way as the continuous sign-up. In fact, CREP enrollment data are included as a subset of the continuous CRP sign-up data. CREP, however, is a program that allows states considerable flexibility to use the federal program to achieve state-specified conservation objectives. It requires a certain state match of federal funding. The option exists to enroll land under CREP beyond the list of conservation buffer practices eligible for the continuous sign-up, and the level of rental rate incentives offered landowners for enrolled acres in any particular state is negotiable. Most of the 17 CREP programs approved to date also focus only on portions of the states involved; in other words, they are not statewide programs.

The Ideas

Given the specific focus of the continuous CRP sign-up on conservation buffers and the prominence of the program in terms of the federal budget commitment to it, a decision was made to concentrate discussion in the Policy Work Group on refinements of that specific program or a replacement program. Participants in this work group thus were asked to offer ideas for improving the continuous CRP sign-up, both from a conservation perspective and from a landowner's perspective, or propose a new program to achieve similar conservation purposes using buffer technology.

The idea-generating portion of the work group process resulted in 73 specific recommendations for improving the continuous CRP sign-up (see Appendix B). Fourteen additional recommendations for policy reform were offered by the Research Work Group and Communication Work Group members, some of which duplicated recommendations from Policy Work Group members. Interestingly, not a single recommendation was offered for a program that might replace the continuous CRP sign-up.

The preponderance of recommendations had to do with (a) expanding the scope and permanence of the program, (b) building greater flexibility and clarity into program rules and administration, (c) simplifying enrollment and enhancing USDA's capacity and commitment to deliver the program to landowners, and (d) increasing the financial incentives offered farmers and ranchers for participation.

Expanding the Program

Recommendations for expanding the scope and permanence of the continuous CRP sign-up ranged from codifying the program in the next farm bill and providing for a specific acreage holdback under the CRP cap to extending the length of CRP contracts, use of restricted covenants, or purchasing longer term easements, with upfront payments, on land in buffers. Substantial support was registered for eliminating the cropping history test and restrictions on enrollment of marginal pasture and making all agricultural land—cropland and grazing land—eligible for participation. There also were recommendations for adding more buffer types to the list of practices eligible for the continuous CRP, including field borders, center-pivot irrigation corners, wetland restoration on marginal pasture, and irrigation wellheads.

Many of the recommendations from work group participants aimed at building greater flexibility into administration of the continuous CRP at state and local levels.

Adding Flexibility and Clarity to the Program

Many of the recommendations from work group participants aimed at building greater flexibility into administration of the continuous CRP at state and local levels. These were the result of differences in agricultural practice across the country, along with striking variations in precipitation; establishment and maintenance of native vegetation, particularly in areas where environmental conditions are more extreme; and the conservation objectives of individual farmers and ranchers. Considerable discussion, for example, focused on the lack of flexibili-

ty in the mix of grass, shrubs, and trees used in riparian buffers and the prohibition on haying and grazing of buffer practices for maintenance purposes. Periodic removal of plant material from streamside buffers is necessary to maintain buffer functions, according to some work group participants; haying or grazing also is needed in some circumstances to sustain vegetative health.

Other recommendations sought to clarify administration of the program and add flexibility to it by relaxing restrictions on what odd areas could be incorporated into continuous CRP contracts; more clearly defining what marginal pasture is; using natural regeneration to establish riparian buffers, with follow-up cost sharing if natural regeneration fails; and allowing the installation of filter strips and riparian buffers along constructed drainages, regardless of flow direction.

Particular concern was expressed about the inability to use the continuous CRP sign-up to meet state and local environmental regulations. Brown County, Wisconsin, for example, enacted a setback ordinance several years ago to help clean up Green Bay in Lake Michigan. FSA has since ruled, however, that cropland along permanent and seasonal streams in the county that might be devoted to filter strips or riparian buffers is no longer eligible for enrollment in the continuous CRP sign-up, in part because the land is no longer capable of being legally cropped under the ordinance. Program rules specify that, to be eligible, cropland must be physically and legally capable of being cropped. Other USDA conservation programs have no such restrictions; in fact, other programs are commonly viewed as tools to help farmers and ranchers meet their stewardship obligations under federal, state, and local environmental regulations.

Relations between FSA and NRCS were an important topic of discussion as well, with particular concern expressed about interagency differences in policy interpretation, at the national level to some degree, but more so at state and local levels. Participants suggested that such differences were constraining program participation in some areas. Recommendations that one agency or the other be given exclusive responsibility for administering the program, however, received little support.

Simplifying Enrollment and Improving Program Delivery

Excessive paperwork and the multiple visits to USDA service centers necessary to complete enrollment were among the chief reasons for recommendations to streamline program participation. Integral to this discussion were suggestions that both FSA and NRCS lacked the staff resources and, in some cases, the staff commitment to administer the program in timely fashion. There were recommendations that USDA streamline application and planning procedures and even provide for a one-stop, in-the-field indication of eligibility for the continuous sign-up. Lack of adequate technical assistance in some locations prompted suggestions for use of third-party vendors to facilitate conservation farm and ranch planning and a recommendation that Congress fix the limitation on use of Commodity Credit Corporation funds for technical assistance purposes. Timely measurement of buffer acres and processing of CRP contracts by FSA personnel also were mentioned as constraints to participation in some locales.

Of particular concern to some participants was the lack of emphasis given in both agencies to the continuous CRP sign-up specifically and the buffer initiative more generally. Specific recommendations were offered to put greater workforce priority on delivering the program and encouraging field staff to be more proactive in use of the program. Other public- and private-sector partners will help, work group participants said. There was even a recommendation to create a buffer ambassador program, with funding to help local organizations promote the use of conservation buffers.

Increasing Financial Incentives

Money matters, according to work group participants, and the financial incentives now

Riparian buffer, Sonoma County, California
USDA/NRCS Photo

available through the continuous CRP sign-up account for the program's success in some areas and the lack thereof elsewhere. Support was strong for continuing those incentives, which include a signing incentive and a practice incentive payment, beyond 2002 and extending those incentives to the entire list of buffer practices eligible for the continuous CRP. Paying different incentives among the list of eligible practices complicates program administration and creates confusion among potential participants, some said.

Support also existed for creating two new incentives: one to encourage initial buffer demonstrations in counties lacking buffers and another to reward groups of farmers or ranchers who collectively act to install buffers on a landscape scale.

There was considerable discussion about current CRP rents and the process used to set those rents. In some cases, work group participants suggested that CRP rental rates ought to be updated more frequently. Countering that view was the contention that changing CRP rental rates often or even now and then confuses landowners. Setting a single rental rate for each county or group of counties also was seen as a means of streamlining the program application and planning process.

This discussion also prompted questions about the adequacy of CRP rental rates for irrigated acres and marginal pasture. Because CRP rental rates are traditionally based on soil types and cash rents for dryland cropping systems, they fall short of what farmers and ranchers often are willing to take in return for installing buffers on irrigated land. A recommendation was offered that CRP rents be reviewed and that a rental rates be set that achieve greater equity between dryland and irrigated land.

Much the same argument was made about marginal pasture rents, particularly in the western United States. The rental rates paid within the continuous CRP for riparian buffers on marginal pasture were reduced in 1999 after complaints that landowners were being overpaid for installing those buffers on marginal pasture, even though the soil types might be the same as on adjacent cropland. Later, following considerable study within USDA, the rental rates on marginal pasture were raised in some locations and a more simplified rental rate scheme was adopted. The rental rates paid in the West, however, remain too low in the minds of many conservationists and landowners who contend that the most and best forage on rangeland oftentimes is that in and adjacent to the riparian zone. The continued prohibition on haying and grazing of buffers, even for maintenance purposes, adds further to the mindset many landowners have about the apparent unprofitability of program participation.

This discussion of rental rate inequities quickly evolved into conversation regarding the basis for continuous CRP rental payments and whether the payment scheme should be divorced from the traditional CRP rental payment calculations. Some work group participants suggested that landowners ought to be paid for buffers on the basis of the environmental benefits produced, rather than on the combination of soil type and local cash rent for agricultural land. Their contention was that a riparian buffer in Idaho probably produces much the same level of environmental benefits as a riparian buffer in Illinois or Maryland, but the rental rate and incentives paid for such a buffer in one location fall far short of what are paid elsewhere.

Annual maintenance payments for certain buffer practices also got some attention from work group participants. Most comments focused either on the fact that maintenance payments were inadequate in the case of certain practices or that maintenance payments are now viewed by most landowners as part of the annual rental payment per acre and the needed maintenance rarely gets done as a result. While it is not evident in the final policy reform agenda adopted by the work group, there was some support for making maintenance payments on the basis of actual maintenance work required and completed.

The Agenda

In the end, the Policy Work Group adopted a 15-point agenda for reforming the continuous CRP sign-up in ways that, in their view, would make the program work better for conservation, for landowners, and for USDA. Six of these policy reforms would require congressional action; three of the reforms would require a rule change; the remaining six could be accomplished administratively.

Policy Reform Requiring a Statutory Change

❶ Allow limited, managed haying and grazing of conservation buffers in the continuous CRP for maintenance and other purposes.

Buffers, as living filters, capture sediment, nutrients, chemicals, and pathogens. As the concentration of some of these potential pollutants builds up within buffers, removal of at least some of the vegetation is necessary for maintenance purposes. Haying or grazing under an approved plan, for maintenance purposes, is thus essential to the proper functioning of some buffers. Haying or grazing also can be advantageous in maintaining healthy stands of vegetation within buffers over a period of time, and the periodic use of forage from buffers could be an added incentive to program participants. A change in statutory language is necessary to overcome the current prohibition on haying and grazing of CRP acres, except under emergency circumstance.

❷ Increase the CRP acreage cap to accommodate the continuing enrollment of conservation buffers.

From the outset of the continuous CRP sign-up, USDA and Congress have annually agreed to an acreage holdback for buffers under the current 36.4-million-acre CRP cap. That holdback is currently 4 million acres. Debate continues, however, about the use of a substantial acreage for buffers under

the current CRP cap for buffers as opposed to the general sign-up. Work group participants thus recommended increasing the CRP cap to accommodate an acreage holdback for buffers, without impacting the number of acres available for the general sign-up. While no specific numbers were incorporated into the group's recommendation, discussion generally focused around a holdback of 4 million to 5 million acres and a CRP cap on the order of 40 million acres.

❸ Allow wetland restoration as an eligible practice on marginal pastureland.

The continuous CRP sign-up now accommodates only the enrollment of riparian buffers on marginal pastureland. Work group participants identified wetland restoration as a practice that could help achieve numerous conservation objectives within riparian zones on grazing land, including flood control, groundwater recharge, water quality improvement, and fish and wildlife habitat enhancement.

❹ Permit contracts longer than 15 years under the continuous CRP sign-up.

Recognizing that the useful life of some buffer practices extends beyond the current maximum of 15 years for CRP contracts, work group participants suggested that additional contract options be added in the program's statutory language to realize the long-term environmental benefits of certain buffers.

❺ Codify a CRP acreage holdback for conservation buffers in the continuous CRP sign-up.

In addition to ensuring that acres remain available as a holdback under the CRP cap for buffer enrollments (see recommendation 2), work group participants recommended that such an acreage holdback be written into statutory language in the next farm bill.

❻ Explicitly incorporate the continuous CRP sign-up and its CREP component into the next farm bill.

USDA created both programs by administrative rules, using authorities in the 1996 and prior farm bills. To ensure the continuation of both programs, work group participants recommended codifying both in the new farm bill.

Policy Reform Requiring a Rule Change

❼ Make all agricultural land eligible for filter strips/riparian buffers.

Currently, only cropland that has been in production of certain agricultural commodities in two of the prior five years is eligible for enrollment in the continuous CRP, along with marginal pastureland, on which a landowner must establish a riparian buffer. These limitations preclude the enrollment of buffers on other working land, such as land in fruit and vegetable production. This recommendation would allow the continuous CRP sign-up to be extended to all cropland and grazing land, regardless of crop produced or frequency of production.

❽ Streamline enrollment in the continuous CRP sign-up with new application and planning procedures, including the use of technical assistance from outside NRCS.

Anecdotal evidence suggests that application and planning procedures in some USDA service centers is long and involved, requiring multiple trips to the service center to complete the enrollment process. Work group participants suggested streamlining the application and planning processes, using less paper and interactive computer systems within service centers, along with third-party technical assistance, where necessary.

❾ Provide a restrictive covenant or permanent easement option for participants in the continuous CRP sign-up, with rental payments made up front.

Authorities exist to use easements or mechanisms other than contracts within the context of the CRP. This recommendation goes beyond the use of contracts (see recommendation 4 above) by endorsing the use of those authorities by FSA to ensure that the environmental benefits of some buffers extend beyond the current program limitations.

Policy Reform Requiring an Administrative Change

❿ Change the riparian buffer standard to permit more grass and fewer trees and shrubs to be used in these buffers.

By definition, a riparian buffer includes trees and/or other woody vegetation in those portions of the buffer adjacent to a stream, lake, or wetland. How many trees and/or shrubs pre acre must be planted is governed in part by the technical standard for a riparian buffer, which NRCS writes, and by the interpretation of rules implementing the CRP, the statutory language for which requires planting trees on marginal pasture. Differences of opinion among personnel within each agency and between agencies have resulted in differences of opinion in some locations over how many trees are needed to meet the spirit and letter of the law. As a result, few riparian buffer installations result. This recommendation suggests giving USDA personnel at state and local levels greater flexibility to adjust the mix of grass, trees, and shrubs in riparian buffers to suit particular conservation objectives and harmonize buffer installations with local ecological conditions.

⓫ Provide a new incentive for the initial buffer demonstration in any particular county or watershed.

Few or no buffer installations have occurred in many locales. On the basis that demonstration by farmers or ranchers who are looked up to by their peers in a community is a good way to encourage use of new technology, work group participants supported use of an incentive for initial buffer installations in counties or small watersheds.

⓬ Allow local USDA officials, via local work groups, greater flexibility in implementing the continuous CRP sign-up.

Buffers, like most conservation practices, must be designed, installed, and maintained to fit site-specific conditions. Landowner objectives also vary significantly. This recommendation is aimed at giving local USDA personnel greater flexibility in the use of buffers enrolled in the continuous CRP, for example, greater flexibility in the kind, numbers, and seeding rates of plant materials used; the width of buffers; the planning of integrated buffer systems; the protection of remnant prairie areas; and so forth.

⓭ Offer a financial bonus or incentive to those farmers and ranchers who collectively use the continuous CRP sign-up

to install buffers along a particular watercourse, around a water body, or within a particular landscape.

USDA's conservation assistance programs typically reward individual farmers and ranchers for their conservation actions. On a watershed or landscape scale, however, action often is required by multiple landowners if there is to be any significant environmental impact. This recommendation encourages USDA to extend the financial incentives of the continuous CRP sign-up to groups of landowners willing to act collectively in the public good. The Oregon CREP now provides for this with a cash incentive that is paid to all of those landowners who install a riparian buffer along a particular stream stretch by a certain date. This kind of incentive makes landowners salesmen and saleswomen for the program.

14 Extend all financial incentives in the continuous CRP sign-up to all eligible buffer practices.

Currently, rental rate incentives only apply to 5 of the 10 buffer practices eligible for the continuous CRP sign-up. Other buffer practices do not qualify for the sign-up incentive or for maintenance payments. This complicates program administration by USDA personnel and creates confusion among landowners. Work group participants suggested that all incentives be applied to all eligible buffer practices as a means of simplifying program administration and improving landowner understanding of program details.

15 FSA and NRCS need to put more proactive people (employees and partners) in the field to implement the continuous CRP sign-up and give the program greater emphasis among workforce priorities.

Use of the continuous CRP sign-up varies dramatically from county to county and state to state. In many cases, work group participants concluded, this was because FSA and/or NRCS administrators have not given the program's delivery the emphasis it deserves. This recommendation was based on the premise that buffer technology remains an underutilized technology and the continuous CRP remains an underutilized program in many locations. Recognizing the limited staff within both agencies at some locations, participants also wanted to encourage the solicitation of partners from both the public and private sectors to help promote the use of buffers and the continuous CRP as part of a more comprehensive approach to dealing with conservation problems on the nation's working land.

Conservation buffer strips, Tama County, Iowa
USDA/NRCS Photo

Buffers: A Communication Agenda

One-on-one contact with landowners is key to buffer use. USDA/NRCS Photo

From its outset, the National Conservation Buffer Initiative was intended to be an information and education initiative, not a program initiative with any kind of financial assistance or other form of conservation assistance attached to it. Its purposes have been to make farmers, ranchers, and other private landowners and managers more aware of buffer technology and what USDA programs exist to help them use that technology more effectively to address a myriad of conservation issues on working land.

A series of focus groups with farmers and ranchers was conducted early on to determine how familiar those landowners were with various buffer practices, with USDA programs, and with terminology often used in reference to buffers, such as green strips or green stripes. The views expressed by focus group participants proved helpful in selecting a theme for the National Conservation Buffer Initiative, in writing some of the early key messages for the initiative, and in preparing an initial buffer brochure that was made available to landowners and managers nationally through USDA service centers.

Subsequent information and education activities, from a national perspective, concentrated on placing articles on buffers in farm magazines, in doing interviews with farm broadcasters about buffers, in organizing exhibits and making speeches at national meetings of farm and conservation organizations, in providing training sessions for field representatives of several agribusiness firms and organizations, and in giving USDA employees some basic tools, such as a slide set (with script), to carry out information and education activities locally.

Not long after USDA officials announced creation of the buffer initiative in early 1997, two privately sponsored initiatives also were announced. Both were intended to complement the USDA effort, and both have worked in concert with USDA in the years since. The first of these two initiatives was formation of the National Conservation Buffer Council. This organization, sponsored by several major agribusiness firms and farm groups—Cargill, ConAgra, Farmland Industries, Monsanto, Novartis Crop Protection, Pioneer Hi-Bred International, Terra Industries, National Corn Growers Association, and National Council of Farmer Cooperatives seek to encourage the use of conservation buffers and supporting practices by agricultural producers, largely as a means of improving water quality. The council has undertaken a number of outreach activities, including an awards program that recognizes conservation district efforts to promote the use of buffers. The council also has sought policy refinements in the continuous CRP sign-up that will make the program more attractive to potential participants.

The second of the privately sponsored initiatives was the Southeast Conservation Buffer Campaign. Supported by the U.S. Environmental Protection Agency and several agribusiness interests, along with the Tennessee Valley Association and the Bass Anglers Sportsmen's Society, the campaign sought to promote the use of conservation buffers in the southeastern United States. Its outreach activities included the production and distribution of several brochures and booklets on buffers and supporting practices, promo-

tional efforts based on one-on-one contacts with landowners in targeted watersheds, and development of buffer displays for use at farm meetings. Because of funding limitations, the campaign announced its intention to cease operation in June 2001.

In an attempt to measure progress with USDA's outreach activities on buffers, a second round of focus groups was conducted in late 1998 and early 1999. That work confirmed that farmers and ranchers were hearing and reading more about buffers and were using some buffer practices, despite having relatively little knowledge about USDA's buffer initiative. The focus group participants also identified some constraints to the use of buffers and the USDA programs available to help them use the technology. Chief among these were the difficulty renters faced in convincing landlords to install buffers on rented land and thus forego rent from that land or, as renters, to realize some benefit from buffer installations. Low CRP rental rates also were identified as a major constraint, along with the CRP's prohibition on haying and grazing. Focus group participants were most vociferous about the lack of flexibility in administering USDA programs, like the continuous CRP sign-up, at the local level. Some even suggested making the continuous CRP an independent program, not subject to some of the restrictions of the general CRP.

This feedback from landowners, coupled with the added financial incentives that were put in place in May 2000, resulted in the development of a new buffer brochure and poster that could be used nationally to make farmers and ranchers aware of program changes, particularly its added economic incentives. These materials were distributed to USDA service centers during the summer of 2000 and remain available today. In this same time period, NRCS, in cooperation with the National Association of Conservation Districts (NACD), initiated publication of a bimonthly newsletter, "BufferNotes," to keep conservation district leaders, USDA employees, National Conservation Buffer Team members, and other partners abreast of policy and programmatic details as well as innovative information and education activities. FSA has since provided the necessary financial support to make the newsletter a monthly periodical.

Concurrent with the national information and education effort, many innovative state and local efforts have been undertaken to promote the use of conservation buffers. Statewide buffers teams have been created to further buffer initiative goals locally. A variety of private-sector partners have taken the lead in raising money to hire part-time employees in conservation district offices who make one-on-one contact with landowners and managers to talk about buffers and their use. Geographic information systems have been employed to match land suitable for various buffer types with landowner and operator names, followed by a personal contact. A great deal of this activity, however, has been concentrated in a handful of states or in a handful of counties within a particular state.

Parallel to the information and education activity, a National Conservation Buffer Technical Team within NRCS developed a training program on buffers. This was intended for delivery to agency employees and partners at state and local levels. It encompassed both upland and riparian buffer types. Rather than being delivered as independent buffer training, however, the training package was ultimately incorporated into a series of CORE-4 train-the-trainer sessions that were conducted within each of the six NRCS regions. Anecdotal evidence now suggests that at least some of that training effort has not sufficiently filtered down to the USDA service center level. Buffer training thus remains a paramount need, according to some agency employees and other public- and private-sector partners.

It was with this background that SWCS chose to incorporate a Communication Work Group into the buffer workshop.

The Ideas

Communication Work Group members were asked to come to the workshop with ideas to (a) improve communication with landowners about buffer technology and the USDA programs available to use that technology and (b) improve communication and training of USDA personnel on the use of buffers to address a range of conservation issues. A total of 63 ideas were offered; another 8 came from the Policy and Research Work Groups (see Appendix B).

Many ideas sought to expand information and education efforts nationally, while others captured the need to provide materials with a local flavor. Ideas ranged from those requiring a lot of planning and legwork—recruitment of a well-known spokesperson and production of a national public television special—to activities that could be accomplished rather easily and economically, with direct local benefits—development of a backyard buffer tip sheet and production of a direct mail piece to targeted landowner constituencies.

Some ideas generated more discussion than others, but none elicited much controversy. Work group members clearly wanted to capture all of the ideas in the action plan and not discard any of them — no matter how realistic or time-consuming a particular idea might turn out to be. Ultimately, five goals were identified, with the specific ideas offered as action items to achieve those goals.

Build Partnerships

Media outreach was a recurring issue in the workshop. Group members agreed that cultivation of national, state, and local media as a means of expanding coverage of buffers and their application in the agricultural sector was needed. Developing constructive partnerships with other governmental agencies, private organizations, and agribusiness interests was another recurring theme.

Develop a Buffer Toolkit

A lot of discussion centered around development of a conservation buffer toolkit. As individual ideas were generated, work group members noted if those ideas should be incorporated into the toolkit. Central to the success of a toolkit, according to work group participants, is the ability for local USDA offices to customize the material. Key elements include (a) templates for brochures or fact sheets that could be adapted to different locations, (b) an economic worksheet that could be reproduced and used by field staff and landowners to calculate the economic benefits of installing buffers under various USDA financial assistance programs, and (c) sample commentary or op-ed pieces for local newspapers.

Initiate Buffer Training

The need for training of USDA personnel and partners did not generate a lot of discussion, but all work group participants agreed on its importance. NRCS employees and partners need training on the effective use of buffer technology, the integrated use of USDA conservation incentive programs to support buffer installations, and techniques for successful program delivery. Several work group participants argued that updated training was needed to rectify the shortcomings of earlier training activities.

Market Buffers

A small portion of the work group members voiced a need for more client-based research. Other group members noted that focus groups had been conducted, but agreed that additional information could be beneficial. Questions the research could answer included (a) which landowners are using buffers and why and (b) what further information do NRCS employees and partners need to incorporate buffer technology into conservation farm and ranch plans. There was limited discussion about the merits of creating email list serves for various groups, such as (a) USDA employees and partners directly involved in administering the continuous CRP sign-up and other conservation assistance programs, (b) individuals who market buffers at the state and local levels, and (c) the Communication Work Group.

Expand Support

Passionate comments were made promoting mutual advocacy and the need for a broad base of constituency support. Emphasis was placed on the need for information and education activities aimed at urban constituencies because policymakers ask them to support—financially and otherwise—USDA conservation assistance programs for farmers and ranchers. In addition, including information on buffers in curriculum materials for school children was recommended. Though important, work group participants agreed that outreach to the educational community should be secondary to actions aimed at communicating with farmers, ranchers, and other landowners and managers who install conservation buffers.

The Agenda

The Communication Work Group's action plan is based on the five aforementioned goals. Each goal is supported by specific action items designed to promote the use of conservation buffers. The action items were culled from the original list of more than 70 ideas generated by the work groups.

The first action item listed for each of the first four goals was identified by work group members as a key activity that the group felt could be acted on quickly and would likely generate substantial results if implemented. The group realized that the last goal—expand constituency support—could not be achieved quickly, and all the action items listed for that goal would be necessary for long-term success.

Build More Extensive Partnerships

1. Conduct a conservation buffer information and marketing workshop in each of the six NRCS regions to discuss partnering opportunities and innovative techniques for making one-on-one contacts with landowners.

2. Develop partnerships with corporate America and other allies to promote the use of buffers, including (a) the solicitation of funds from business to help promote participation in the continuous CRP sign-up and (b) collaboration with an organization, such as the National Arbor Day Foundation, to sponsor a national conservation buffer poster contest.

3. Determine how USDA conservation assistance programs can be used in conjunction with programs sponsored by state/local governments and private organizations to extend the use of buffer technology.

4. Make sure USDA's conservation assistance programs—particularly the continuous CRP sign-up—can work jointly with other federal programs (such as those administered by the Army Corps of Engineers, Fish and Wildlife Service, and Environmental Protection Agency).

5. Develop an advocacy group of farmers and ranchers who have installed buffers to speak to other farmers, ranchers, farm managers, rural bankers, etc., about the merits of using these conservation practices.

Develop a Buffer Toolkit and Related Promotional Materials

❻ Provide "how-to" partnering information and success stories for use in "BufferNotes," on the NRCS website, and in other widely used forums.

❼ Develop a buffer promotional toolkit that includes:

- Specifications for signage
- PowerPoint presentation
- Examples of direct mail pieces
- Exhibit designs
- CD of buffer photographs
- Economic worksheet for local use

❽ Develop computer-based, interactive economic tools for field office use.

❾ Provide guidance to field staff on how to identify priority areas for targeting promotional efforts.

❿ Develop templates for materials that can be customized for local promotional activities.

Initiate More Extensive Buffer Training

⓫ Each region should organize a one-day meeting/tour for state technical committees, other partners, policymakers, and decision-makers to see how farmers and ranchers are using buffers and to hear from them on the merits of using the technology.

⓬ Develop a buffer training strategy for NRCS staff, other USDA agencies, and state/local/private sector partners that can be delivered at the state level and includes technology, program delivery, and marketing components.

⓭ The buffer training strategy should be implemented and evaluated during federal fiscal years 2002 through 2005.

Ohio filter strip
USDA/NRCS Photo

Identify Marketing Strategies

⓮ Organize a conservation buffer forum at the NACD annual meeting for the benefit of conservation district leaders, district employees, and partners.

⓯ Through additional audience analyses, identify target audiences and develop key messages for those audiences.

⓰ Outline media strategies to address communication needs (a) within USDA—by providing tools for local use—and (b) outside of USDA—targeting both small and large markets.

⓱ Produce a series of promotional items—hats, T-shirts, etc.—and work to establish a National Buffer Day that might be celebrated in conjunction with Arbor Day, Earth Day, or a similar event.

Expand Constituency Support

⓲ Target those utilities responsible for providing drinking water.

⓳ Target those decision-makers involved in resolving total maximum daily load (TMDL) issues.

⓴ Target urban dwellers who control the votes nationally.

㉑ Target the developers and users of K-12 curriculum materials who are in a position to incorporate information about conservation buffers into those educational materials.

㉒ Target environmental interests that have a large stake in the use of buffers by landowners across the country.

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APPENDIX B: FLIP-CHART SUMMARIES

Research Work Group Ideas

1. Ecoregion assessment of the potential effect of forest buffers on stream geomorphology (7 votes).

2. Monitoring and evaluation of the effect of new and established buffers—on a watershed scale—relative to water quality, aquatic life, and terrestrial life (12 votes).

3. Evaluate landscape position and natural resources suitable for buffers—variable-source hydrology (10 votes)

4. Quantify the impact of upland buffers on field-scale hydrology (3 votes).

5. Tie buffer effectiveness to TMDLs on a watershed scale (9 votes).

6. Buffers to deal with manure-borne pathogens (2 votes).

7. Site index for species selection in buffers (3 votes).

8. Develop statistical tools to use existing plot-scale information at the watershed scale (1 vote).

9. Effectiveness of buffers in tile-drained areas—develop buffer systems that would be effective in tile-drained areas (12 votes).

10. Develop procedures to evaluate nitrate removal by buffers, based on hydrology and soil characteristics (4 votes).

11. Determine how the effect of water quality modifying processes in conservation buffers differ among geologic settings (9 votes).

12. Evaluate the performance of buffers in different hydrologic landscapes, including seasonal effects.

13. Develop procedures to evaluate pesticide removal by buffers.

14. Determine temporal, seasonal, and vegetative community effects on the environmental performance of buffers and how long it takes to achieve maximum effectiveness, i.e., runoff patterns (6 votes).

15. What is the effectiveness of tree-based buffers on mitigating odors from CAFOs?

16. Evaluate paired watersheds with riparian and wetland buffers (4 votes).

17. Proactive research—identify specific problems and then do research to solve those problems (2 votes).

18. Designing buffers, wetlands, and tile systems to work in complementary fashion when used in conjunction with each other (12 votes).

19. Buffer enhancement of in-stream removal and processing of nutrients and pesticides (5 votes).

20. Establishment of appropriate buffer types in different ecoregions for performing water quality functions (7 votes).

21. Research on the use of buffers within pastoral grazing systems (5 votes).

22. Develop harvesting strategies for nitrogen and phosphorus from riparian zones/areas (4 votes).

23. Examine buffer zones relative to carbon sequestration (2 votes).

24. Understand the ecological ramifications of placing buffers on the landscape with regard to beneficial and nonbeneficial organisms, from vertebrates to pathogens (9 votes).

25. Create a research methodology for evaluating the economics of buffers systems and quantifying benefits to landowners and taxpayers (8 votes).

26. Determine the long-term consequences of active versus passive restoration (11 votes).

27. What measures are needed to make buffers more effective at improving water quality in channelized ditches (1 vote)?

28. Cost-effective approaches for increasing shallow groundwater flow (within the biologically active zone) discharges under different geologic settings to avoid concentrated flow and create more infiltration prior to buffer (2 votes).

29. Role of riparian buffers in mobilizing trace elements and phosphorus (4 votes).

30. Long-term studies on effects of herbicides on species and species composition of buffers (3 votes).

31. Evaluate the effectiveness of different buffer plant communities on streambank erosion—with and without bioengineering (3 votes).

32. Evaluate the effectiveness of plant species on intercepting pesticide drift.

33. Economic evaluation of providing alternative agricultural production systems that provide a direct economic product from buffers (2 votes).

34. Methods to enhance the establishment and growth of seedlings in buffers.

35. Natural processes required for riparian ecosystem restoration (3 votes).

36. Research on market and product development of goods from buffer systems (4 votes).

37. Effect of harvesting on performance of buffers (4 votes).

38. Enhance RUSLE, WEPS, and other field-scale models to address buffer practices—particularly flow redirection, backwater effects, slope of upstream deposits, and clear water coming out of buffers (5 votes).

39. Incorporate buffer functions, particularly riparian buffers, into watershed-scale models (13 votes).

40. Use of buffers in other than agricultural settings (8 votes).

41. Comprehensive planning and design methodology for conservation buffers (2 votes).

42. Effectiveness and maintenance of level-spreaders, water bars, vegetative barriers, and

other practices at dispersing concentrated flow (6 votes) and effects of antibiotics on denitrification functions of wetlands and riparian buffers (1 vote).

43. Protocol and procedure to inspect buffers and estimate their effectiveness—"buffer quality kit" (8 votes).

44. Evaluate soil carbon aggregates and microbial dynamics under different buffer conditions (1 vote).

45. Long-term management schemes for maintaining buffer effectiveness (2 votes).

46. Methodology for maintenance of buffer systems (7 votes).

Research Ideas from the Policy Work Group

1. Need performance data on buffers with regard to pathogens and pathogen indicators.

2. Establish ecological principles and standards for landscape-scale buffers designed to improve water quality.

3. What level of riparian treatment is enough on a watershed scale to achieve water quality and habitat goals?

4. How do we value (in dollars preferably) and measure environmental benefits of buffer systems?

5. Look at grazing, haying, and incidental economic use on the environmental performance of buffers.

Research Ideas from the Communication Work Group

1. Expand buffer literature to include reduction in flood damage, water retention, and flow augmentation.

2. Do more field-level buffer research and demonstration.

Policy Work Group Ideas

1. Provide for contracts longer than 15 years under the continuous CRP (6 yes votes)

2. Change the riparian buffer standard to allow more grass and fewer shrubs, trees. Combined with a portion of idea 57 and idea 67. (9 yes votes).

3. Allow local officials, via local work groups, greater flexibility in program implementation (6 yes votes).

4. Streamline the continuous CRP enrollment process—application and planning, including receipt of technical assistance from outside the USDA/state/conservation district system (6 yes votes).

5. Make all agricultural land eligible for filter strips/riparian buffers. Combined with idea 8. (12 yes votes).

6. More flexibility in taking odd areas into the continuous CRP (5 yes votes, 1 no vote).

7. Allow limited, managed haying/grazing of the continuous CRP buffers, e.g., for maintenance. Combined with idea 27. (11 yes votes).

8. See idea 5.

9. Review continuous CRP rental rates, where necessary, to achieve greater equity between dryland and irrigated land (1 yes vote).

10. Make field borders eligible for the continuous CRP (1 yes vote, 1 no vote).

11. Allow a single contract across multiple USDA programs (1 yes vote, 4 no votes).

12. Provide clear definition of marginal pastureland (1 no vote).

13. Change name of the continuous CRP to buffer initiative and create independent program administered by NRCS (5 yes votes, 9 no votes).

14. Base continuous CRP rental rates for marginal pasture on agricultural value of land to landowner (2 yes votes, 1 no vote).

15. Allow cost-share for animal control devices on all woody plantings (2 yes votes, 2 no votes).

16. Emphasize use of forest buffers on all streams, but particularly 1-3 order streams (2 yes votes).

17. Agencies need to give the continuous CRP greater emphasis in priorities for workforce (5 yes votes).

18. Offer a bonus for collective action within the continuous CRP (6 yes votes).

19. Put more proactive staff in the field to implement the program (6 yes votes, 1 no vote).

20. Allow use of the continuous CRP to help landowners meet state/local regulations, including drainage district regulations (4 yes votes, 3 no votes).

21. Do not permit cost share for exotic/invasive plants (4 yes votes, 2 no votes).

22. NRCS/FSA need to harmonize NRCS practice standards with FSA program policies (3 yes votes).

23. Base continuous CRP rental rates on environmental benefits, not soil rents (5 yes votes, 1 no vote).

24. Codify CRP acreage hold-back for buffers (6 yes votes).

25. Reduce penalty or extend grazing period for livestock producers (1 yes vote, 1 no vote).

26. Increase maintenance payments for actual maintenance work (1 yes vote).

27. See idea 7.

28. Allow for management of USDA contracts on continuous CRP by state/local governments (3 yes votes, 7 no votes).

29. Define what "odd areas" are for purposes of the continuous CRP (1 no vote).

30. Allow wildlife as a purpose for the continuous CRP (1 yes vote).

31. Increase reimbursement to NRCS by the Commodity Credit Corporation for technical assistance (6 yes votes, 2 no votes).

32. Allow more flexibility in planting guidelines where environmental conditions are extreme (3 yes votes).

33. Allow cost share for fencing and livestock crossings (1 yes vote, 1 no vote).

34. Tie riparian buffers/filter strips to compliance provisions (2 yes votes, 6 no votes).

35. Allow cost sharing for fence and water development outside the continuous CRP contract area (2 yes votes).

36. One-stop, on-farm indication of continuous CRP eligibility (4 yes votes).

37. Extend all continuous CRP financial incentives to all buffers (6 yes votes).

38. Fix the section-11 cap problem (5 yes votes, 1 no vote).

39. Accept waterways on functionality, not crop history.

40. Fund buffer ambassador program—limited funding to help local organizations promote buffers (5 yes votes, 2 no votes).

41. Eliminate pro rata rental payments—pay on crop year, not months (2 yes votes).

42. Simplify approval process—e.g., quicker measurement of eligible areas (4 yes votes).

43. Increase CRP acreage cap to accommodate continuing buffer enrollment (8 yes votes).

44. Make payment upon sign-up (3 yes votes).

45. USDA/FSA contract for third-party technical assistance (4 yes votes, 3 no votes).

46. Require cover best suited for wildlife (3 yes votes).

47. Allow cost-share for fence on CP-5a (2 yes votes, 1 no vote).

48. Eliminate upper precipitation limit for supplemental drip irrigation (3 yes votes, 2 no votes).

49. Increase cost share for tree shelters (3 yes votes, 1 no vote).

50. Don't allow fluctuation in rental rates. (1 yes vote, 1 no vote).

51. Provide an added incentive for the initial buffer demonstration within a county/watershed (8 yes votes).

52. Make the maintenance payment separate from the rental payment, via landowner certification, with some spot checks for compliance (5 yes votes, 3 no votes).

53. See idea 62.

54. Allow wetland restoration on marginal pastureland (7 yes votes).

55. Allow field borders wider than 15 feet (4 no votes).

56. Encourage more CREP agreements (2 yes votes).

57. Pay regular rental rates on marginal pasture (1 yes vote, 1 no vote).

58. Uncouple the continuous CRP from CRP; conservation district makes payments; conservation district has approval/oversight (1 yes vote, 2 no votes).

59. Let FSA administer all conservation programs to ensure local control/flexibility via county committee (2 yes votes, 17 no votes).

60. Allow expired CRP to be used as continuous CRP cover if it's a 40-point mix or better (2 yes votes).

61. Negotiate a safe harbor provision with the Fish and Wildlife Service for threatened and endangered species within the continuous CRP (1 yes vote).

62. Make sure the continuous CRP and CREP has farm bill future. Combined with idea 53. (6 yes votes).

63. Eliminate general CRP signup and allow continuation of the continuous CRP, CREP, farmable wetlands (1 yes vote, 13 no votes).

64. Continue CRP and increase cap to 63 million acres (8 yes votes, 1 no vote).

65. Add center-pivot corners to the continuous CRP eligible practices list (1 yes vote, 7 no votes).

66. Expand farmable wetlands pilot to playa lake region at minimum and nationwide preferably; eliminate acreage limitation (3 no votes).

67. See idea 2.

68. Provide a long-term-agreement option or a permanent easement option for the continuous CRP, with rental payments up-front (6 yes votes).

69. Make irrigation wellheads eligible for enrollment (1 yes vote, 3 no votes).

70. Allow limited grazing on winter wheat (2 no votes).

71. Use restricted covenants in conjunction with the continuous CRP (2 yes votes, 2 no votes).

72. Allow filter strips along drainages, regardless of flow (1 yes vote).

73. Allow states/local governments/others to access USDA program funds with specified match (2 yes votes).

Policy Ideas from the Communication Work Group

1. Find funding for contractors, incentives, etc.

2. Centralize accountability.

3. Accelerate implementation in urban areas—where the votes are.

4. Work with landowners who are out of compliance—or those who don't qualify for CRP, CREP, etc.—provide technical assistance for them.

5. Clarify what is eligible and what is not.

6. Lack of funding for in-office administration.

7. Make sure that natural regeneration is part of the program.

8. Expand continuous CRP wellhead protection to source-water protection.

Policy Ideas from the Research Work Group

1. Include wetlands restoration/creation as an allowable practice in the continuous CRP to address tile drainage-water quality issues.

2. Provide more flexibility in strip width for sediment control in the continuous CRP (include vegetative barriers). Adjust payments rates to reflect large benefits from small strips.

3. More options on marginal pasture than tree planting in riparian buffers to more closely reflect native plant communities.

4. Allow passive (natural) regeneration on riparian buffers (parallel to policy on field borders in Mississippi, for example).

5. Encourage policy that spurs watershed-scale implementation of buffer initiative.

6. Provide incentives for landowners to work together to install buffer systems on adjacent lands.

Communication Work Group

1. User-friendly insert for landowners on costs/benefits of buffers (3 votes).

2. Partner with corporate America (5 votes).

3. Motivate the sales staff.

4. Lack of dollars for in-office administration.

5. Form a clearinghouse for buffer articles/success stories/images on the web (4 votes).

6. "Buffers are good business" service center tool kit (9 votes).

7. Update photo-base and make it more accessible to field offices—on CD (2 votes).

8. Develop USDA strategy for regional/state buffer courses and workshops (7 votes).

9. Clarify what's eligible, what isn't.

10. Identify target audiences and the best tools to reach them (5 votes).

11. Cross-pollinate USDA programs with state, local, and other riparian programs (1 vote).

12. Target public water suppliers (1 vote).

13. Develop farmer advocacy group to talk to farmers, work with farm manager groups, etc.—reach the hard group. (5 votes).

14. Sales/marketing training for field staff (2 votes).

15. Marry USDA buffer programs with appropriate programs of other federal agencies.

16. Target outreach to financial lenders (2 votes).

17. Work with landowners out of compliance—or those who don't qualify for CRP, CREP—provide technical support for them.

18. Seek well-known spokesperson

19. Recognize at county level all the landowners who have buffers—ad, sign, map, etc. (2 votes).

20. Professionally done traveling exhibits—regional basis (4 votes).

21. Guidance document on how to target buffers in a watershed (6 votes).

22. Provide information to those working on TMDL plans.

23. Find out why farmers have adopted buffers and modify programs to reach those who haven't—research non-adopters (5 votes).

24. Accelerate implementation in urban areas—where the votes are.

25. Develop a module or curriculum-enrichment tool for school children (3 votes).

26. Share inner-office success stories—how what one is doing relates to another—why are they successful.

27. Provide more material that can be customized at state or local levels—digitally or with blank space (6 votes).

28. Feature story on conservation and buffers in National Geographic (2 votes).

29. Centralize accountability.

30. Compile list of major media in a state and target them—1-3 largest per state (1 vote).

31. Direct-mail postcard to pre-identified farmers * target absentees (2 votes).

32. Interactive tools, i.e., Ohio spreadsheet (7 votes).

33. Interactive tools that are simple for field offices to customize i.e., not pdf.

34. Identify allies and recruit them to help sell buffers (4 votes).

35. Tie rural buffers to urban water supplies and vice versa (2 votes).

36. Find funding for contractors, incentives, etc.

37. Develop and distribute PSAs.

38. Develop newsletter articles for other organizations to use.

39. Economic bullets (2 votes).

40. Find more visual tools and visual ways to tell the story.

41. Do a "sign-up for buffers" program—matching dollars with business (3 votes).

42. PBS special on buffers (2 votes).

43. Expand buffer literature to include reduction in flood damage, water retention, and flow augmentation.

44. Include extension partners in training and development of ed-outreach materials (2 votes).

45. Sit down with smalltown broadcasters/reporters and "talk buffers"—suggest interviews, story ideas, etc. (3 votes).

46. Develop "Backyard Buffers" tip sheet (4 votes).

47. Media tours.

48. Educate "greenies."

49. Contest of "Best Guest Commentary" for newspapers.

50. National Conservation Buffer Poster Contest, organized by National Arbor Day Foundation or similar organization (1 vote).

51. Develop PowerPoint buffer presentation for local use (2 votes).

52. Make sure that natural regeneration is part of the program.

53. National Buffer Day (1 vote).

54. Do a picture spread on buffers for magazines and newspapers.

55. Mutual advocacy (3 votes).

56. Publish lessons learned—environmental research on buffers (2 votes).

57. Buffer logo on hats, t-shirts, mugs, and other trinkets (3 votes).

58. Neighborhood buffers in urban areas—open space, green space, greenbelts, etc. (3 votes).

59. Signs with buffer logo (5 votes).

60. Do more applied, field-level buffer research.

61. Op-eds for local newspapers by local landowners (3 votes).

62. Use testimonials more, especially locally (1 vote).

63. Expand the continuous CRP from wellhead protection to source-water protection.

Communication Ideas from the Policy Work Group

1. Nationwide buffer award/recognition program

2. Buffer update insert to CRP contract-holders

3. Training/education for USDA employees, partners, landowners on stream ecology—locally.

4. Marketing-promo roadside signage.

5. Direct landowner contact.

6. Appoint coordinator to organize partners.

Communication Ideas from the Research Work Group

1. Complications of working in tile-drained landscapes if primary objective is nitrate removal—wetlands, other options in buffers. Treat like "Backyard Buffer" tip sheet.

2. Decision aides that are user-friendly and help landowners and the general public. Included in sales kit: (b) stream usual assessment and (b) crop sequence calculator

Living snow fence, north central Iowa USDA/NRCS Photo